STRATEGIC INTEGRATION OF HOSPITALS AND PHYSICIANS

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April 2001

[1] This paper has benefited from discussions with Richard Gilbert and Steve Shortell. Cuellar gratefully acknowledges financial support from the Agency for Health Care Research and Quality, the American Association of University Women, and the Robert Grossman Endowment. Gertler gratefully acknowledges financial support from the National Institute of Aging. The usual disclaimer applies.

[2] beginning July 2001

A striking development in the hospital market has been the formation of strategic relationships with other providers, particularly physicians. By 1998, 66 percent of hospitals had either acquired or formed a long-term contract with one or more physician organizations (Figure 1). Moreover, these strategic relationships are not with a single organizational type. Rather, the organizational structures are complex and diverse. They vary from loosely networked, open configurations to exclusive, fully integrated models and have lead to integration of activities ranging from joint and administrative services to fully integrated clinical services, information systems, and compensation schemes.

Hospital-physician integration likely reflects providers' organizational responses to rapidly expanding managed care. Proponents of closer hospital-physician relationships argue that they are welfare-improving, because they may lead to efficiency gains from transaction cost economies, improved ability to deal with incomplete contracting challenges, and economies of scope. Indeed, hospitals may be attempting to improve their strategic position with managed care insurance plans 1) by reducing costs associating with contracting with managed care, or 2) by gaining competitive advantage through lower costs or higher quality. While the early literature emphasizes primarily transaction cost, information asymmetries, and scope economies (Robinson and Casalino 1995; Robinson and Casalino 1996; Robinson 1997; Robinson 1999); more recent work raises questions whether strategic alliances may be attempts to improve bargaining or market power with managed care plans (Gal-Or 1999; Gaynor and Haas-Wilson 2000). Increased prices from market bargaining power are likely to be welfare reducing.

This paper empirically investigates the impact of hospital-physician alliances on hospital cost economies, quality and bargaining power with insurers. Whether these strategic relationships have welfare-increasing effects or welfare-reducing effects is central to the

effectiveness of public policy around these alignments. Some public policies recently have encouraged the formation of hospital-physician alignments. For example, Medicare through its "Medicare+Choice" program has authorized participation by Provider-Sponsored Networks, which are hospital-physician organizations. These organizations contract directly with Medicare as integrated entities, as a means of improving quality and lowering costs. In contrast, in 1995 and 1996 the Department of Justice brought actions against hospital-physician organizations in Connecticut, Missouri, and Louisiana, arguing that the vertical relationships between monopoly hospitals and a large share of physicians in the market restrained competition and resulted in higher prices. If hospitals are creating alliances with physicians to improve coordination of care, to lower costs and to be more competitive for managed care contracts, then the result is likely to be welfare improving. However, if the motivation is anticompetitive, then there is a rationale for enforcing antitrust laws to prevent such alliances. Currently, there is little empirical support for either view.

This study uses panel data from Arizona, Florida, and Wisconsin for 1994 to 1998 to estimate the impact of strategic alliances on hospital performance. We exploit differences in the performance predictions of the two competing theories across organization types to identify the model. Specifically, the transactions cost models predict lower costs and lower prices, while the market power models predict no change in costs and increases in prices. We also exploit the panel to treat the strategic alliances as a choice in the analysis.

This study finds little support for the transaction costs or economies of scope explanations for the effect of strategic alliances. Instead there is evidence of higher prices, particularly among exclusive alignments and among those in concentrated hospital markets.

This has implications for more rigorous anti-trust scrutiny of hospital-physician strategic alliances.

This analysis proceeds in three sections. First, it lay out the transaction costs and market power theories around hospital-physician alliances. The second section describes the institutions of hospital-physician alliances and their formation. The third section provides empirical evidence on the effects of alliances on hospital performance. Finally, it discusses future directions.

1. MOTIVES FOR HOSPITAL-PHYSICIAN STRATEGIC ALLIANCES

The strategic response of hospitals to form relationships with physicians has been fast-paced. By 1998, 66 percent of hospitals had formed strategic contracting alliances with physicians, twice the proportion in 1993 (Burns, Bazzoli et al. 2000). This fast-paced growth in hospital-physician integration likely reflects providers' response to expanding managed care. Figure 2, using data from Arizona, Florida and Wisconsin, shows that hospitals in high managed care areas were more likely to have strategic alliances with physicians than hospitals in low managed care areas. Only 29 percent of hospitals in low managed care areas had alliances in 1994, compared to 70% of hospitals in high managed care areas.[3]

Before managed care, indemnity insurance would pay any hospital or physician chosen by a patient on a cost-plus or fee-for-service basis. Managed care brings about a change in contracting and reimbursement for hospital services. Unlike indemnity insurers, managed care plans seek to selectively contract with hospitals in order to negotiate lower hospital prices, shift

[3] Data on hospital-physician alliances are obtained from the American Hospital Association's Annual Survey of Hospitals. Managed care penetration is calculated from hospital patient discharge data provided by the state agencies from Arizona, Florida, and Wisconsin. A low managed care county has up to 10 percent of patients enrolled in managed care (25th percentile), while a high managed care county has more than 30 percent of hospital patients enrolled in managed care (75th percentile or more). Medium managed care is defined as counties with 10 to 30 percent of hospital patients enrolled in managed care.

payment risk to hospitals, and form quality networks that appeal to their enrollees. Managed care plans extract price discounts by threatening to exclude providers from their selected networks. Hospitals wanting to improve their competitive position may try to lower costs and improve quality or may develop strategies to counter managed care bargaining power. At the same time that managed care has risen, indemnity insurers, particularly in high managed care areas, also have moved to paying discounted rates, increasing the incentive for hospitals to respond. Physicians face similar pressures from managed care, making it more attractive to them to form strategic alliances with hospitals, than was historically the case under indemnity insurance with fee-for-service payment.

One response to the rise of managed care is for hospitals and physicians to integrate. The literature provides two explanations for why hospitals and physicians have formed alliances in response to managed care. The first is a transactions costs argument that such alliances increase efficiency and quality. With greater efficiency, providers are able to offer managed care plans lower prices without sacrificing quality. The second is that hospitals and physicians ally in order to improve their bargaining position with managed care plans and other insurers and thereby raise prices. The next section summarizes the theoretical arguments and their predictions for hospital performance.

1.A. Efficiency and Quality

Before managed care, under fee-for-service payment to physicians and cost-plus payment to hospitals, there was little financial incentive for hospitals and physicians to work together to economies of scope and otherwise become more efficient. In a managed care environment,

where providers are paid via capitation[4] and other forms of prospective payment[5], physicians and hospitals accrue the financial benefits of increased efficiency providing a reason for integration. Indeed, Bazzoli, Dynan et al. (2000) argue that the primary purpose of these organizations is to acquire global capitation contracts that cover both hospital and physician care so that hospitals and physicians can maximize joint profits through better control over the total costs of service delivery.

Strategic alliances may more easily permit the use of financial incentives to lower cost and improve quality, such as risk-based payments, bonuses or withhold pools (Klein, Crawford et al. 1978; Williamson 1988). Contracting with closely organized delivery systems allows managed care plans to more easily use capitation and other cost and quality controls (Snail 1999).[6] Some argue that the primary purpose of these organizations is to acquire global capitation contracts so hospitals and physicians have better control over service delivery (Bazzoli, Dynan et al. 1999/2000).

The care of any one patient typically spans both hospital and physician office settings. By changing the process of patient care and coordinating care across sites, joint hospital-physician organizations may improve the ability of hospitals and physicians to exploit economies of scope7. Shared information systems can be put into place to gather data on costs, quantity, quality, and monitor performance relative to benchmarks. Integrated management can facilitate

[4] Under capitation, managed care plans pay a provider a fixed fee per insured person per month and the provider is at risk for the cost of care should the person become ill. Capitation provides an incentive for providers to keep the cost of care to a minimum.

[5] Other forms of prospective payment include paying a fixed fee to treat an illness such as Medicare care Diagnostic Related Groups or a fixed per diem. In these cases the provider is at some financial risk for the costs of care.

[6] Under capitation providers are paid a fixed fee per insured person and face the risk of higher production costs. Global capitation refers to a joint rate for hospitals and associated physicians.

[7] There is a large literature describing the pathways by which hospital-physician integration might be able to improve efficiency and quality. For example see DiMaggio and Powell (1991), Burns and Thorpe (1993), Shortell, Gillies et al. (1993), Morrisey, Alexander et al. (1996), Robinson and Casalino (1996), Robinson (1997), Snail and Robinson (1998), Robinson (1999) and Robinson (1999) and Snail (1999).

the sharing and use of information and identify areas of complementarity and substitutability. Since the hospital and the physician are both inputs into the care of a patient, integration of management and information might improve care coordination and therefore health outcomes and efficiency. However, there are substantial administrative costs to such coordination, which may offset any savings.

A patient's use of hospital resources is in large part the physician's choice; e.g. the length of stay in the hospital, the number of diagnostic tests and the aggressiveness of treatment. In un-integrated settings the marginal cost of hospital resources to the physician is close to zero and well below the marginal cost of supplying hospital services. Tighter integration may facilitate the use of financial incentives to lower costs (Klein, Crawford et al. 1978; Williamson 1988). By restructuring financial incentives, the interests of hospitals and physicians may become more closely aligned and thereby reduce costs.

There are theoretical reasons for hypothesizing that not all types of organizations will be equally successful in reducing transaction costs or controlling clinical costs (Grossman and Hart 1986; Conrad, Mick et al. 1988; Williamson 1988; Shortell, Gilliew et al. 1993; Gaynor 1994; Gaynor and Gertler 1995; Conrad and Shortell 1996; Robinson and Casalino 1996; Gal-Or 1997). Integrated firms can strengthen administrative controls and achieve better cost and quality control through strong group norms, peer pressure, and integrated finances (Robinson 1999). However, they face attenuated incentives on the part of physicians, if physicians are placed on salary and no longer own and reap direct benefits from their assets (Gaynor and Gertler 1995). Integrated firms are better able to adapt to changes that require coordinated action, but not individual action. Exclusivity of the arrangement is also likely to affects its efficiency. Exclusive arrangements allow hospitals to limit their physician panels to high quality

and low cost providers, enhancing the ability to compete against other hospital-physician alliances. Exclusive contracting also may ensure sufficient volume for hospitals to gain price concessions and assure adherence to quality controls. Finally, the likelihood that such efficiencies will be realized is also a function of local competition (U.S. Department of Justice & Federal Trade Commission 1996). Efficiency motivations, leading to lower costs or higher quality, are more likely in more competitive markets.

If there are efficiency gains from economies of scope or better patient care coordination, then the integrated hospital is a better position to compete for managed care contracts. It can offer managed care plans a lower price for the same or better level of quality. In this case, integrated hospitals will have lower costs of care, higher managed care volume, and lower managed care prices.

There is one case where hospital prices might rise due to transaction cost gains. Along with improvements in quality and efficiency, strategic alignments relationships may reduce the administrative costs associated with the managed care contracting ("Coasian" transaction costs). Networks may lower contracting costs between a health plan and numerous providers, by creating a single point of contracting. By networking with physicians, hospitals can streamline marketing, contracting and negotiation with health plans, limit the number of parties involved, and reduce transactions costs (Baker 1999). The surplus (or gain) from lower transactions costs may be shared between the health plan and the strategic alliances leading to higher hospital prices. In this case we expect to see (at least weakly) high provider prices and higher managed care volume with no change in the costs of care.

Despite theoretical grounds to believe that hospital-physician integration might lower costs and improve quality, there are few studies that assess these efficiency claims. The few

studies that exist provide conflicting results[8]. However, all of these studies used cross-sectional data and treated the organizational form as exogenous.

1.B. Market Power, Exclusivity, and Small Markets

There are several different theories by which hospital-physician integration may be used to increase market power. Gal-Or (1999) considers the case where hospitals and physicians negotiate with insurers as a unit. If the hospital-physician unit fails to reach an agreement with an insurer, both hospital and physicians drop out of the insurer's network. This would lead to a decline in insurer demand by subscribers, thus the hospital-physician organization can bargain more aggressively. Gal-Or (1999) demonstrates that mergers between hospitals and physician practices can enhance their bargaining power relative to insurers, even when the relationship is not exclusive. However, whether joint profits increase or decrease depends on if the degree of competitiveness in hospital and physician markets is comparable. For example, a hospital in a competitive market (e.g., due to low occupancy rates) may increase its bargaining leverage by tying its fortune to differentiated physicians. The providers in the more competitive markets gain because they can negotiate higher rates through joint negotiation. However, the differentiated physicians would have little incentive to dilute their bargaining power by joining with the hospitals. If the degree of competitiveness is comparable, both can gain. This motivates the use of exclusivity clauses. In the absence of exclusivity clauses, vertical integration may not occur if the relative competitiveness of hospital and physician markets differs sharply.

[8] Empirical studies of the effect of hospital-physician integration on hospital costs and profits include Alexander (1988), Conrad, et al, (1996) and Dynan, et al (1998), Goes (1995) and Project HOPE (1996).

Second and more generally, Bernheim and Whinston (1998) and (Riordan and Salop 1995) demonstrate that vertical relationships can confer market power if there are barriers to entry.[9] Entry barriers can stem from cost advantages, sunk costs, and preentry strategic behavior. Managed care plans' propensity to contract with networks of providers may act as a barrier to entry. Hospitals and physicians may be able to raise barriers to entry by forming exclusive alliances. If providers or classes of providers can not compete effectively without access to a network, this may harm competition in those markets. The exclusivity of the network alliance and the competitiveness of the provider market also are important. With exclusive arrangements, health plans may not be able to access high quality or low cost providers without contracting with the alliances. Consequently, health plans may not be able to switch easily to other providers or alliances in response to price increases. The less competitive the market, the more likely such strategic alliances are able to prevent managed care plans from switching their enrollees to other providers.

A third, similar line of argumentation is that hospital-physician relationships may create a cost advantage by increasing costs for potential entrants through "most favored (MFN)" clauses in purchaser contracts (Baker 1996; Gaynor and Vogt 1999; Gaynor and Haas-Wilson 2000).[10] MFN clauses used by dominant insurers may decrease health care providers' incentives to lower prices to other insurers. These clauses may lead to higher prices for insurance by raising rival insurers' costs and deterring entry into the insurance market.

Fourth, in a model of price competition with heterogeneous products, hospitals may be able to increase their market power by differentiating their product (in a vertical differentiation

[9] If there are no barriers then prices that generate excess profits will signal competitive entry opportunities.

[10] A "most-favored-nation" clause is an agreement in which the seller (e.g., hospital-physician entity) agrees not to charge a buyer more than the lowest price is charges any other buyer.

sense) through physician alignment. Alignments may increase physician loyalty to a given hospital, thereby increasing admissions (holding price constant). Consequently, price elasticity of demand for a hospital's services would fall and mark-ups could increase. Competitors in such markets also would be able to increase prices. Product differentiation softens competition because price cutting is less effective at taking rivals' business. In this sense, hospital-physician alignments act as a form of "rebranding" and would work much the same as a promotional effort (Cabral 2000; Pepall and Richards 2000).

Finally, vertical relationships also may confer market power by facilitating horizontal collusion (Baker 1999). The improved data systems and coordination of prices for the network product also may lead to coordination of prices for the unbundled products.

In summary, the two bodies of theory make the following predictions:

Transactions costs economic (TCE) models predict:

1. Hospital and physician alliances may change the process of patient care, leading to greater economies of scope and better coordination. This would result in lower costs of care, higher managed care volume, and lower managed care prices.
2. If strategic alliances reduce administrative costs ("Coasian transaction costs") associated with managed care contracting, the hospitals will have (weakly) higher prices and higher managed care volume, but no change in the costs of care.

The market power models predict:

3. Hospital and physician alliances lead to greater market power and higher managed care and indemnity prices; and

4. the price increases are greater if the arrangement is exclusive; and

5. the price increases are greater in less competitive hospital markets.

By and large the two motives have different predictions regarding prices and costs. Expect for Coasian transaction costs, TCE predicts cost and price reduction, while market power predicts weakly higher costs (from coordination) and price increases. Market power also predicts that the price increases will be larger in exclusive arrangements and in smaller markets, whereas TCE predicts no difference across these settings.

2. INSTITUTIONS AND IDENTIFICATION OF STRATEGIC ALLIANCE EFFECTS

This section discusses the types of strategic alliances undertaken by hospitals and physicians. Because types of alliances differ with regard to key characteristics, these differences can be used to sort out the theoretical predictions from transactions costs and market power theories. In addition, this section provides evidence regarding which hospitals are likely to adopt strategic alliances. Because forming a strategic alliance is a choice, this has empirical implications that are explained.

There are two major identification issues. The first is a price rise from Coasian transaction costs economies is observationally equivalent to a price rise from an increase in market power. We will exploit differences in organizational types to sort out Coasian TCE explanations from MP explanations. The second is that organizational type is a choice and is likely to be endogenous.

2.A. Variety in Strategic Alliances

In practice, hospital-physician alliances take on a variety of forms, reflecting different types of risk sharing, integration of operations, degrees of exclusivity, and capital investment (Baker 1989; Burns and Thorpe 1993; Morrisey, Alexander et al. 1996; Robinson and Casalino

1996; Snail and Robinson 1998; Burns, Bazzoli et al. 2000). Arrangements range from loosely coupled forms of contracting, such as flexible joint ventures and shared administration, to tight arrangements whereby the hospital purchases physician practice assets and the new entity engages in risk-based contracts with insurers. Hospitals also differ with respect to whether these arrangements are centralized or decentralized; in some cases individual hospitals have formed these arrangements, in others they are sponsored at the hospital-system level.

This study focuses on four types of arrangements formed by hospitals:

1. independent physicians associations (IPAs),
2. open physician-hospital organizations (OPHOs),
3. closed physician-hospital organizations (CPHOs) and management service organizations (MSOs), and
4. fully integrated models (e.g., medical foundations or salary models).

The attributes of these arrangements are summarized in Table 1. Figure 3 shows their frequency nationally and in the three-state sample. Approximately 10 percent of hospitals have IPAs. These are loose contractual networks rather than integrated firms whose sole purpose is to hold managed care contracts and to assist individual physicians in obtaining managed care contracts. Hospitals with IPAs are less likely to have global capitation contracts (Bazzoli, Dynan et al. 1999/2000). By reducing contracting costs, IPAs may result in more managed care contracts and higher prices; however IPAs will not affect operating costs or quality.

"Open" Physician Hospital Organizations (OPHOs) are joint ventures between hospitals and physicians, which facilitate managed care contracting, but may also provide administrative services to physicians, or joint operation of ambulatory care facilities. The PHO allows physicians to maintain separate, independent offices and continue to own their own practices, but

links physicians together through contracts. The PHO allows physicians and hospitals to retain their autonomy over business and clinical operations and is less likely to have capitated contracts. Nonetheless, these arrangements have centralized administration to facilitate contracting with health plans. OPHOs may lead to more managed care contract and higher prices by reducing contracting costs, and potential by improving bargaining power with plans. Previous organizational research finds that PHOs have only moderate levels of integration as measured by standardized business practices, joint planning, and clinical integration (Burns, Bazzoli et al. 2000). Consequently, they are unlikely to lead to lower production costs or higher quality.

"Closed-panel" PHOs selectively contract with physicians based on quality and cost considerations, whereas open-panel PHOs do not. Because closed PHOs form exclusive relationships with physicians they may be able to coordinate care better than their open counterparts. Management service organizations (MSOs) typically buy the physical assets of the participating physicians and provide administrative services (e.g. billing services and record-keeping) to the practice for a fee. Like CPHOs, the relationship with physicians is exclusive and MSOs act as agents to hospital and physicians in controlling with managed care plans (Morrisey, Alexander et al. 1996). They are given high integration scores in the organizational literature (Bazzoli, Dynan et al. 1999/2000). In this analysis, MSOs are treated as CPHOs, because of their similarities. Together they are referred to as CPHOs. Because of their close relationships with hospitals, CPHOs may also improve efficiency through standardization, leading to lower productions costs and potentially higher quality. However, they also may raise prices by improving bargaining power with plans, particularly due to their exclusive nature.

Integrated firms, such as medical foundations and salary models, are the most closely related, exclusive entities. They hire physicians as salaried employees, purchasing both physical and intangible assets (i.e., the entire practice) and often consolidate physicians into centralized locations (Morrisey, Alexander et al. 1996; Snail 1999). Their effect is on quality is predicted to be stronger than that of CPHO. Clinically, they have the greatest potential for coordinating care and improving efficiency, although they face the greatest moral hazard risk due to attenuating incentives for physicians who are placed on salary. Salary model alliances are the most likely to accept capitation contracts from HMOs (Burns, Bazzoli et al. 2000). In addition to being more efficient costs, salary models may be able to improve bargaining power and transactions costs, thereby leading to higher prices.

The distribution of strategic alliances has shifted over time: the more tightly organized, exclusive arrangements (CPHOs and Salary Models) have become more prevalent, relative to looser IPAs and OPHOs (Figure 4). This pattern occurred consistently across markets, whether they were urban (metropolitan statistical areas) or not

2.B. Identification

The organizational variety of hospital-physician relationships is used to test the competing hypotheses. Table 2 maps the transaction cost/efficiency and market power predictions to the organizational typology. Network-style organizations, IPAs, primarily serve as contracting vehicles, allow a test of "Coasian" transaction cost-related explanations for strategic alliances. In contrast, OPHOs, CPHOs, and Salary models allow a test economies of scope and bargaining power explanations. If transaction costs are reduced one would expect to see higher prices across all forms of alignment. If efficiency gains are the primary motivator, costs should decline, in particular for the most closely integrated and exclusive alliances, but not for loose

IPAs. Similarly, quality improvement should lead to higher costs for the more closely integrated alliances, but quality improvement is unlikely for IPAs. Finally, price effects are predicted for OPHOs, CPHOs and Salary models, with stronger effects for CPHOs and Salary due to the exclusivity of the arrangement. Price effects also are predicted to be greater in less competitive hospital markets.

A key methodological concern in all of the analyses is controlling for the fact that the existence of the strategic alliances is not randomly assigned across hospitals, but rather the result of a strategic choice. The reasons that hospitals choose such relationships have to do with their abilities to control costs and obtain managed care contracts and these abilities are typically not observable. Consequently, the researcher may attribute performance differences to the strategic alliance when, in fact, performance reflects the underlying, unobserved organizational abilities.

The choices hospitals make are likely to be a result of unobservable firm-specific factors, such as managerial ability, competitive strategy, output quality, or hospital technology, that is highly correlated with key performance measures such as costs, prices, and quality and other regressors. For example, higher quality hospitals may be more likely to integrate and have more managed care contracts. The unobservable error term includes a firm-specific component that reflects unobservable heterogeneity and a common stochastic error. As a result, cross-sectional analyses are likely to be biased.

This study takes advantage of the panel nature of the data and uses fixed effects to control for hospital and market characteristics, both observed and unobserved. Using the fixed effects specification essentially compares the change in an outcome variable for a hospital before and after it establishes a strategic alliance to the change in the outcome for a comparison hospital that does not change its strategic alliance over the same period of time. To the extent that the

unobserved characteristic is managerial ability or trust between hospitals and physicians, it is largely fixed over the five-year time period and can be dealt with appropriately in this manner. Fixed effects estimation only controls for unobservable characteristics that are fixed over time.

However, there may be time-varying shocks that would not be accounted for using fixed effects. Such time-varying shocks could be market-wide (such as managed care penetration or input costs) or hospital-specific (such as cost shocks). While unobserved demand and productivity changes are not captured through fixed effects, they are in part controlled for using observed market changes, such as managed care penetration, wage index variables, and time dummies. Other idiosyncratic, hospital-specific shocks to demand or productivity are not measured, therefore, it is important to understand the organizational choice. In order to better understand strategic alliance formation and control for potential biases, the next section undertakes an analysis of organizational choice – i.e., what determines whether a hospital forms an alliance and, if so, what type. The fixed effect empirical strategy would break down if integration decisions are driven by idiosyncratic productivity shocks to the hospital.

2.C. Adoption of Strategic Alliances

This section investigates the relationship between hospital and market characteristics and the choice of strategic alliances. The sample includes non-public, general, acute hospitals from Arizona, Florida, and Wisconsin from 1994 to 1998.[11] The three major sources of data are 1) the American Hospital Association's (AHA) Annual Survey of Hospitals, which provides data on strategic alliances, hospital ownership, bedsize, and teaching status; 2) hospital-level annual financial data collected by the state agencies, which provide information on hospital operating costs and payer discounts, 3) patient-level discharge data, which provides information on

[11] Public hospitals, specialty hospitals (e.g., psychiatric hospitals) and hospitals with fewer than 100 discharges are excluded.

hospitals' discharges and days of care by payer type, case mix (a measure of patient severity or intensity of care), county-level managed care penetration, and quality indicators. Table 3 provides descriptive statistics for this and all subsequent analyses.

The first model is a multinomial logit model that provides correlations between hospital and market characteristics and the likelihood of strategic alliance with physicians (Table 4). The regressors include managed care penetration[12], the area-wide hospital wage index as a measure of hospital input costs,[13] whether the hospital is located in an urban area (metropolitan statistical area), the size of the hospital measured in beds, whether the hospital is a teaching facility, and whether the hospital is a for-profit institution.

The first question is whether market-wide factors are associated with adoption of strategic alliances. The results show that managed care penetration is significantly associated with the formation of all types of strategic alliances, except salary models. Other market variables, such as the wage index and urbanicity are unrelated to alliance formation. Salary models are quite differ from other alliance types in other respects. They are more likely to be non-profit and teaching hospitals, whereas others are more likely to be large, for profit, nonteaching hospitals.

The second model is a model of adoption. Table 5 presents a transition matrix showing the proportion of hospitals that switch from one type of strategic alliance (including none) to another. An observation is a hospital in a given year. Over the sample period, one quarter percent of the observations changed their strategic alliance status, indicating considerably amount of change during the sample period.

[12] Managed care penetration is measured as the proportion of hospital discharges in the county covered by health maintenance organizations or preferred provider organizations.

[13] The wage index is measured at the metropolitan statistical area level and is provided by the Health Care Financing Administration.

Table 6 presents a more formal model of adoption, by estimating the determinants of the transition probabilities as a first-order Markov process. This model can be estimated using a multinomial logit where the dependent variable is the state to which the hospital transitioned, as a function of its previous state and other covariates (Amemiya 1985). In addition to the regressors used previously, this model includes three measures of managed care penetration and a measure of productivity shocks. Managed care is measured as 1) lagged managed care penetration, 2) the lagged change in managed care penetration to measure managed care expansion, and 3) the hospital's own lagged share of patients who are covered by managed care to measure the hospital's dependence on managed care. Hospitals in high managed care markets, in markets with high managed care growth, and with high managed care dependence are predicted to form alliances. The productivity shock is measured as the lagged change in own hospital average costs.

The results of the adoption model show that IPA, OPHO, and CPHO formation seem to be driven market-level force, in particular by managed care (first three rows). Noticeably different is the formation of the Salary model, which does not appear correlated with managed care. Another important result is that the measure of idiosyncratic productivity shocks in not a significant predictor of adopting any of these types of integration (fifth row). This lends further support for the use of panel data and fixed effects because we can use the fixed effects to control for bias due to organizational choice in the performance models. The potential unobserved factor that leads hospitals to form strategic alliances appears to be a fixed characteristics of the hospital or a market wide force, rather than firm-specific shocks.

3. EFFECTS OF STRATEGIC ALLIANCES ON HOSPITAL PERFORMANCE

To estimate the effect of strategic alliances on hospital performance, this study constructed measures of hospital average costs, hospital prices, hospital quantities, and quality. This section addresses the construction of the performance measures and then the empirical results.

3A. Construction of Performance Measures

Average cost. Costs per discharge and per day were constructed by dividing total operating expenses (less depreciation plus interest) as reported on each hospitals' financial data divided by total discharges and days respectively. Due to the skewed distribution of these cost variables, they are log-transformed in the regressions below.

Quantities. Payer volumes are obtained from the patient-level discharge. The data contain whether a patient was covered by managed care (HMO or PPO) or indemnity coverage. Total payer volume is the sum of all discharges for a given payer in the hospital. These variables also are log-transformed due to their skewed distribution.

Prices. Prices were constructed in two steps using both states' hospital financial and discharge data. The first step is to adjust the hospital charge per day for the differing health status of patients across hospitals, by creating a standardized charge for each hospital using the patient-level discharge data. These are obtained for each year by regressing the patients per diem charges on DRG, length of stay, age dummies, gender, and a fixed effect for each hospital, similar to Keeler (1999). For each year, the analysis then calculates the average predicted price for each hospital using the entire patient sample for that year. This predicted average charge represents the adjusted hospital-specific charge per day or "standardized price." These standardized prices are calculated for indemnity and HMO/PPO payers separately. Due to the

skewed nature of the log-scale residuals, prices in this stage were estimated using a generalized linear model with gamma distribution and log link function (Mullahy and Manning, 1998).

The discharge data contain information on a patient's total charge, however, these "charges" are effectively list prices, gross of insurer discounts. Hospital average price discounts are calculated from the Annual Financial datasets for managed care and indemnity insurers respectively.[14] To obtain an estimate of transaction prices (rather than nondiscounted charges), the average discounts for HMO/PPO and indemnity lines of business are obtained from the financial data and are applied to the standardized charges.

For salaried models, which sponsor their own integrated insurance products, the observed price likely reflects an internal transfer price, rather than a market price. For this reason, salary models, which also own HMOs, are excluded from the subsequent analysis.

Quality Indicators. Quality measures were created from the patient-level discharge data using indicators developed by the "Healthcare Cost and Utilization Project" (HCUP-3) (Ball, Elixhauser et al. 1999)

The Healthcare Cost and Utilization Project was intended to develop standardized, user-friendly quality indicators that could be calculated from available patient-level discharge data as used in this project. These indicators address potentially avoidable adverse outcomes (in-hospital mortality following common surgical procedures and post-surgical complications), utilization of specific procedures thought to be overused, and ambulatory care-sensitive conditions (i.e., conditions amenable to management in an outpatient setting). Previous research has shown that these indicators are sensitive to changes in financial incentives for hospitals, thus they may rise or fall with changes in strategic alliances (Ho and Hamilton 2000).

[14] The average discount is calculated by payer as total payer charges minus total payer discounts, divided by total payer charges.

For the quality indicators, the patient population is divided into those who are at risk for a given condition and among them those who experienced the adverse event. The risk population varies by age, gender, diagnosis, and procedure depending on the given indicator. For example, only patients having had the particular surgery are at risk for post-surgical complications.

Because some events are extremely rare, this analysis combines the events into four types: inpatient-mortality following common elective procedures, surgical complications, utilization, and ambulatory care-sensitive conditions. In this analysis, "in-patient mortality" includes patients at risk after six common elective procedures (hysterectomy, laminectomy/spinal fusion, cholecystectomy, transurethral prostatectomy, hip replacement and knee replacement). "Surgical complications" after major surgery include pulmonary compromise, acute myocardial infarction, gastrointestinal hemorrhage or ulceration, venous thrombosis or pulmonary embolism, mechanical complications due to device, implant or graft, urinary tract infection, and pneumonia. "Utilization" includes incidental appendectomy among elderly, hysterectomy, laminectomy, transurethral prostatectomy, radical prostatectomy. All of "utilization" procedures are considered to be potentially overused, either because the risk of complication is outweighed by potential preventive effects, or because they are inferior to noninvasive alternatives or watchful waiting. The reader is referred to the quality indicator manual for a review of the literature for each indicator (Ball, Elixhauser et al. 1999). Finally, "avoidable hospitalizations" include several ambulatory-care-sensitive conditions, pediatric asthma, immunization-preventable pneumonia among the elderly, stroke among non-elderly adults, diabetes (short-term and long-term complications). These are conditions that rarely require hospitalization if they receive good monitoring and surveillance, prompt medical care, or

where the risk can be reduced through management, for example, lower blood pressure, lower blood cholesterol, or reduced smoking.

For all of the performance indicators, the empirical results reflect estimates using hospital fixed effects. Separately, random effects regressions were run and tested against the fixed effects specification. In all cases, the null of random effects was rejected.

3B. Hospital Costs

In this section, we test the effect of hospital alliances on hospital costs, because the transaction costs theories suggest that strategic alliances will improve efficiency. This prediction is tested by estimating the impact of strategic alliances on average hospital costs. A multi-product Cobb-Douglas cost function is estimated, modified by including the squares of the output variables. Two versions are tested, one using the log cost per patient day and the other using log cost per patient discharged. Independent variables in the cost function include measures of input costs (area wage index), outputs (average length of stay at the hospital, casemix as a measure of severity of illness, the number of patients covered by managed care, indemnity, and other payers, and these numbers squared), and capital stock (bed size). All models are estimated with state and year effects and year-state interactions, as well as hospital fixed effects.

The cost function results are shown in Table 7. The first two columns report the results for the cost per day model; the second two columns report costs per discharge. The columns labeled (1) show results without controlling for changes in output volume. This specification captures the net effect of strategic alliances on hospital costs, whether through shifts in the cost function or through movement along the cost curve due to changes in scale. Columns labeled (2) control for changes in output volume and reflect shifts in hospitals cost functions due to

alliances. The results show that the strategic alliance variables have mostly small, insignificant effects on costs. The strategic alliances variables are individually and jointly not statistically significant with the exception of CPHO effects on cost per discharge. CPHOs are associated with small declines in cost per discharge, but these effects are not significant when we control for changes in hospital volume. This suggests that there were virtually no gains in efficiency from strategic alliances. The other coefficients are consistent with behavior one would expect for cost functions, e.g., average costs decline with increasing output volume. A joint test of the volume and case mix output variables finds that these are statistically significant.

3D. Hospital Prices and Volumes

The previous section finds not support for the hypothesis that strategic alliances improve efficiency and lower costs. This allows us to look at price changes and draw conclusions about transactions costs and market power hypotheses. Even in the absence of cost effects, the transactions costs theories predict that prices could rise, if there are administrative savings from strategic alliances. In this case, hospitals could receive higher prices and volumes from managed care plans. Consequently, we would observe all types of strategic alliances, including IPAs, exhibiting higher prices. However, if we observe higher prices and volumes only for the tighter forms of strategic alliances, but not IPAs, this is consistent with market power theories.

Table 8 presents results from fixed effects regression of managed care prices and managed care admissions on the strategic alliance variables and market- and hospital- level controls. The first three columns results for prices using three different specifications, the next three use the same specifications for volumes. Results for indemnity prices and indemnity admissions are presented in Table 9 in a similar fashion. The key independent variables are the

strategic alliances measures. Other independent variables are the area input costs and managed care penetration, hospital fixed effects, year effects, and hospital-year interactions.

Columns labeled (1) show the simplest specification. Here OPHOs and CPHOs had positive and significant effects on prices and volumes. As IPAs do not exhibit similar increases, there is no evidence that these increased prices results from administrative transaction costs savings. Instead, the evidence is consistent with the hypotheses that OPHOs and CPHOs use market power to gain managed care contracts on better terms. The OPHOs and CPHOs also obtain higher indemnity prices as shown in columns (1) Table 9. There are no significant effects on volume in the indemnity models.

The market power theories further predicted that price effects would be greater in less competitive markets. The models (2) explore whether the increases in prices and volumes are driven by hospitals that are located in competitive markets by including interactions between the strategic alliance variables and whether the hospital was located in an urban, metropolitan statistical area (MSA). The MSA variable is used a proxy for the competitiveness of the market, with MSAs having greater competition than non-MSAs. This permits a test of whether the effect of strategic alliances is associated with the degree of local competition. A joint test of the MSA interactions are significant at the .07 level of less, except for managed care volumes.

Furthermore, the specifications explore whether ownership type affects the extent to which market power is used. For-profit and non-profit hospitals may have different capacities to exploit their market power or may have different objective functions that alter the use of that power. Consequently, the models include interactions between the strategic variables and the for-profit status of the hospitals. This permits a test of whether the effects of strategic alliances are driven by the ownership status of the hospital. The results for managed care and indemnity

indicate that prices and volumes differ depending on the ownership and competitiveness of the market.

A third specification is presented in models (3) for managed care and indemnity. These parsimonious specifications include only the significant interactions with ownership and MSA, other interactions are held at zero. The multiple interactions make it difficult for the reader to appreciate the magnitude of the effects. To ease interpretation of the results, Table 10 presents the magnitudes of the price and volume effects of strategic alliances across markets and ownership types. Coefficients are scaled to reflect changes as a percentage of price. At the top of Table 10 are managed care effects, at the bottom are indemnity effects.

The results in Table 10 indicate that OPHOs and CPHOS have higher managed care prices. The OPHOs have prices about 6 percent higher than unintegrated hospitals and these differences do not vary with ownership or market. The CPHOs show similar price increases as OPHOs in competitive, MSA markets. The largest increases are among CPHOs in less competitive, non-MSA markets. This is consistent with theoretical predictions that price effects would be greatest for exclusive arrangements in less competitive markets. With regard to volumes, OPHOs and CPHOs have the same increasing effects and these are greater for non-profit hospitals. Overall, the results suggest that OPHOs and CPHOs have market power that results in higher prices and volumes.

With respect to indemnity prices, hospitals with CPHOs and for-profit hospitals with OPHOs have higher prices than other hospitals. Again, the exclusive CPHOs have substantially higher prices than other hospitals in the less competitive, non-MSA markets. In competitive markets the price increases are greater for for-profit hospitals. Unlike OPHOs, CPHOs are able

to increase patient volume in MSA markets. These results are consistent with the market power models.

Finally, IPAs and Salary models are not associated with price or volume increases. While market power models do not predict higher prices for IPAs, Salary alliances are exclusive arrangements, thus their effect on prices would be predicted to be consistent with CPHOs.

The lack of effect for Salary alliances requires further scrutiny. It is possible that Salary models are motivated by hospitals seeking something other than market power. As shown previously, the adoption of CPHOs and OPHOs is driven by managed care, while Salary model adoption is not. These results also indicate that hospitals adopting Salary models are different from those that adopt CPHOs and OPHOs. In particular, they are more likely to be adopted by non-profit and teaching hospitals. Perhaps these hospitals seek to expand teaching, uncompensated care or research. In fact, Table 11 provides further evidence of differences between salary models and other strategic alliances. Here, uncompensated care, measured as total uncompensated care days in column 1 and total uncompensated care discharges in column 2, is modeled as a function of strategic alliance and market level variables. Only salary models are significantly associated with statistically significant increases in uncompensated care. Salary model alliances may also be interested in improving quality of care, rather than market power. The next section explores whether different alliances types affect hospital quality.

3E. Hospital Quality

The efficiency theories predict that quality of patient care could rise if physicians and hospitals are better able to manage patient care across settings. Close alignment between hospitals and physicians could lead to improved quality in several ways. First, hospitals may overcome informational problems through investment in improved, shared information systems

across physician and hospital settings. Under traditional payment arrangements hospitals have little control over the inpatient resources used by physicians. However, the formation of hospital-physician organizations may change financial incentives to remove agency problems by introducing shared financial risk across hospitals and physicians through bonus or withhold pools. These changes are more likely to occur among the more integrated and exclusive arrangements, because such hospitals implement financial, governance, and information systems necessary to monitor change across settings, and ultimately to change the process of patient care. Exclusive arrangements allow hospitals and physicians to tailor patient care to the specific hospital setting and more effectively change group norms. Thus, integrated, exclusive arrangements are predicted to achieve greater quality gains than other types of strategic alliances.

An understanding of how quality changes is important from the perspective of both market power and efficiency theories. As Gaynor and Haas-Wilson (1999) point out, it is important to analyze the impact of alliances on quality in order to draw conclusions about market power. While it is possible that higher prices are the result of greater bargaining power from strategic alliances, it is also possible that they reflect higher quality. If the observed price increases are associated with quality improvements, this is consistent with hospitals attempting to appeal to managed care firms that selectively contract with quality providers. Observing higher prices without changes in quality is consistent with a finding of market power.

The quality analysis also is important for drawing conclusions about efficiency gains. The cost analyses alone can not separate the effects of cost changes due to production efficiency from cost changes due to changes in quality. The lack of findings regarding costs may be due to offsetting effects of simultaneously experiencing greater efficiency and higher quality. If we observe quality improvement with no change in costs, this is evidence of overall improvements

in efficiency, while no quality improvement paired with no cost changes implies no efficiency effects.

Tables 12 and 13 presents results from linear probability models with quality indicators as the dependent variables. Four types of quality indicators are used: rates of in-hospital mortality, surgical complications, rates of utilization of discretionary procedures (considered overused), and rates of avoidable hospitalization for ambulatory-care-sensitive conditions (ACSC). The first three measures focus on the quality of inpatient care, while avoidable hospitalizations generally measure the quality of outpatient care and other non-hospital aspects of the care system. Higher rates of avoidable hospitalizations indicate that there are opportunities for quality improvement in outpatient and preventive care settings.

The quality analysis uses patient-level data, controlling for age, diagnosis, and gender, in addition to hospital, year, state and state-year fixed effects. It separates patients by payer type, which also controls for the fact that changes in quality may reflect changes in the mix of patients admitted. The key independent variables are the strategic alliance types. Robust standard errors are estimate using the "cluster" command at the hospital level (Stata V6). The utilization indicators in particular exhibit large geographic variation, in part due to different geographic normative practices. Such geographic differences in practice styles are well-documented in the health literature and further emphasize the need for area and hospital fixed effects.

Table 12 present the quality measures for managed care patients, while Table 13 presents the measures for indemnity patients. Columns labeled (1) show the average effects of alliances on quality while columns labeled (2) use the parsimonious specification from the price analyses to examine whether these effects vary by hospital ownership or by local competitiveness (MSA area). Hospitals with IPAs and OPHOs exhibited no changes in the quality measures. For-profit

hospitals with CPHOs performed better on the measure of utilization among indemnity patients, by reducing the rates of procedures often considered unnecessary and overused and avoidable hospitalizations. Consequently, a portion of the higher prices for CPHOs in for-profit hospitals. However, CPHOs in less competitive markets were not significantly different from other hospitals. Hospitals with CPHOs also experienced lower surgical complication rates, although this did not vary by ownership or market.

In general strategic alliances had little or no effect on improving inpatient mortality. The exception is CPHOs where inpatient mortality among managed care patients increased (positive coefficient).[15]

Strategic alliances also had little or no effect on ACSCs. Strikingly, hospitals with CPHOs in urban areas experienced worse rates of ACSC (positive coefficient) for indemnity patients.

Salaried models were associated with improvements in the utilization and surgical complication measures. The finding that exclusive models (CPHO and Salary models) were more likely to show improvements in quality is consistent with theoretical predictions. Unlike CPHOs, salaried models experienced quality improvements without price gains. This may reflect their particular organizational objectives as explained above. The result that hospitals with CPHOs experienced modest quality improvements means that at least a portion of the price increase may be due to higher quality and not bargaining power alone. However, given the small coefficients and lack of improvement for ACSC and mortality measures, this effect on price is

[15] The estimates of inpatient-mortality are likely to be biased in favor of strategic alliances. This measure is complicated by the fact that it is censored by a live discharge. Patients may have died after discharge as a result of poor hospital quality, but this is not observed in the data. If hospitals with strategic alignments discharge their patients earlier, their inpatient mortality rates will appear lower even if the true rates are similar. Future work will test these results using Cox proportional hazard models to examine the hazard of inpatient death.

likely be small. Overall, the evidence on costs, quality, and prices supports the market power explanations for strategic alliances to a greater extent than the efficiency explanations.

3E. Specification Tests

Hospitals adopt strategic alliances at different points in time. It is possible that the timing of the strategic alliance has an effect on the change in hospital performance. Because these strategic alliances diffused gradually, hospitals that adopted alliances early may have been more successful than those that adopted them later. The early adopters may have been able to gain an advantage that later competitors could not. Consequently, the above results could be driven by differences between early and late adopters, rather than holding generally. To test whether the results are robust to possible diffusion effects, this section prepared the identical cost and price analyses as above, but excluded hospitals that had already adopted a strategic alliance by the first year in the data (see Tables 14 to 16).

A possible weakness of the panel data approach used in the previous section is that it treats hospitals that add or drop alliances symmetrically. To further test the robustness of the findings, this section also examines whether the results change when hospitals that drop alliances are excluded from the analysis. The drawback to omitting these hospitals is that the sample size is diminished, but it provides a general guide to the robustness of the main findings. Results omitting hospitals that dropped their alliances are shown in Tables 17 to 19.

There are three main messages from the tables presented in this section. One, the lack of finding regarding efficiency gains of strategic alliances holds. Thus, the main efficiency finding is not driven by either the diffusion cycle or by the inclusion of hospitals that later drop their alliances. Second, the findings regarding market power, specifically that exclusive arrangements lead to higher managed care prices, also holds in the modified models, as does the finding that

these price gains are greatest in less competitive markets. The main difference between the main and modified models is for for-profit hospitals, which adopt CPHOs and OPHOs later. They appear to be attain significant lower managed care volume, although there is no difference in their indemnity volumes.

4. DISCUSSION AND FUTURE DIRECTIONS

This study presents results on key performance changes resulting from hospital-physician alliances and the balance between potential efficiency gains and potential market power. It finds no support for the transaction costs and little support for the economies of scope explanations. Instead there is evidence of higher prices and quantities resulting from strategic alliances. These are particularly strong effects among exclusive arrangements in non-competitive markets. This is consistent with theoretical predictions around higher bargaining power, since there is only modest evidence of higher quality.

This analysis has several limitations. One limitation is that only hospital costs are addressed. It is possible that cost savings occurred in the physician sector and are not captured here. However, no changes were noted in hospitalization for ambulatory sensitive conditions, a preliminary indication that the process of care may not have significantly changed in the outpatient setting either. Second, the quality indicators have large standard errors. Consequently, lack of findings for the effect of strategic alignment should be interpreted with caution.

Nonetheless, the findings have important implications for public policy and how strategic alliances are viewed. Public programs, such as Medicare and Medicaid, may want to refine their policies that promote hospital-physician strategic alliances. Refinements would include

distinguishing among markets with greater and lesser degrees of competition. Furthermore, this study provides preliminary evidence to support efforts by antitrust policymakers to more closely scrutinize hospital-physician alliances.

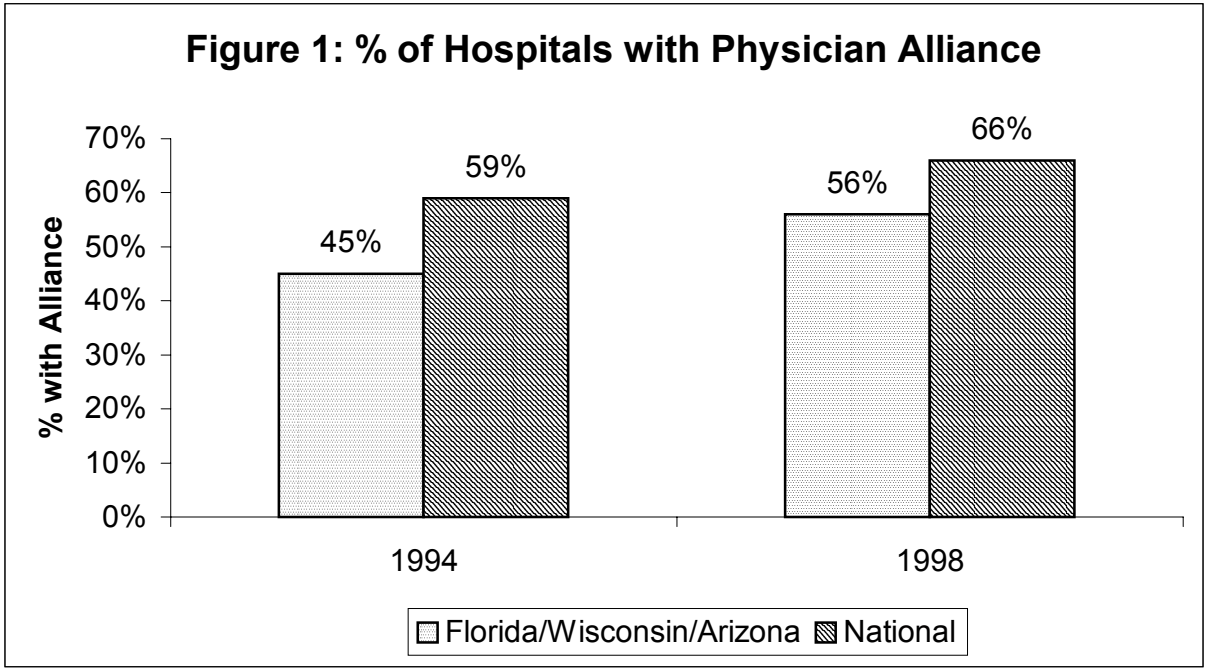
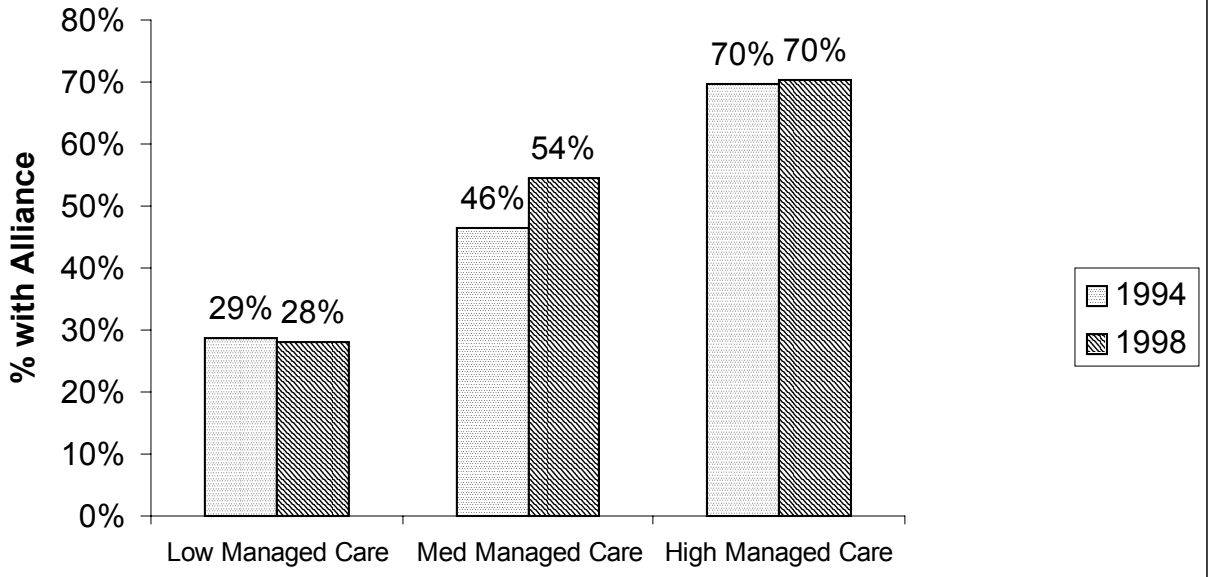


Figure 1: % of Hospitals with Physician Alliance
% with Alliance
70%
60%
50%
40%
30%
20%
10%
0%
45%
59%
56%
66%
1994
1998
Florida/Wisconsin/Arizona
National

Figure 2: % of Hospitals with Any Physician Alliance, by Managed Care Penetration (FL/WI/AZ)



Low:<10% of Inpatients, Medium:10-30% of Inpatients, High>30% of Inpatients

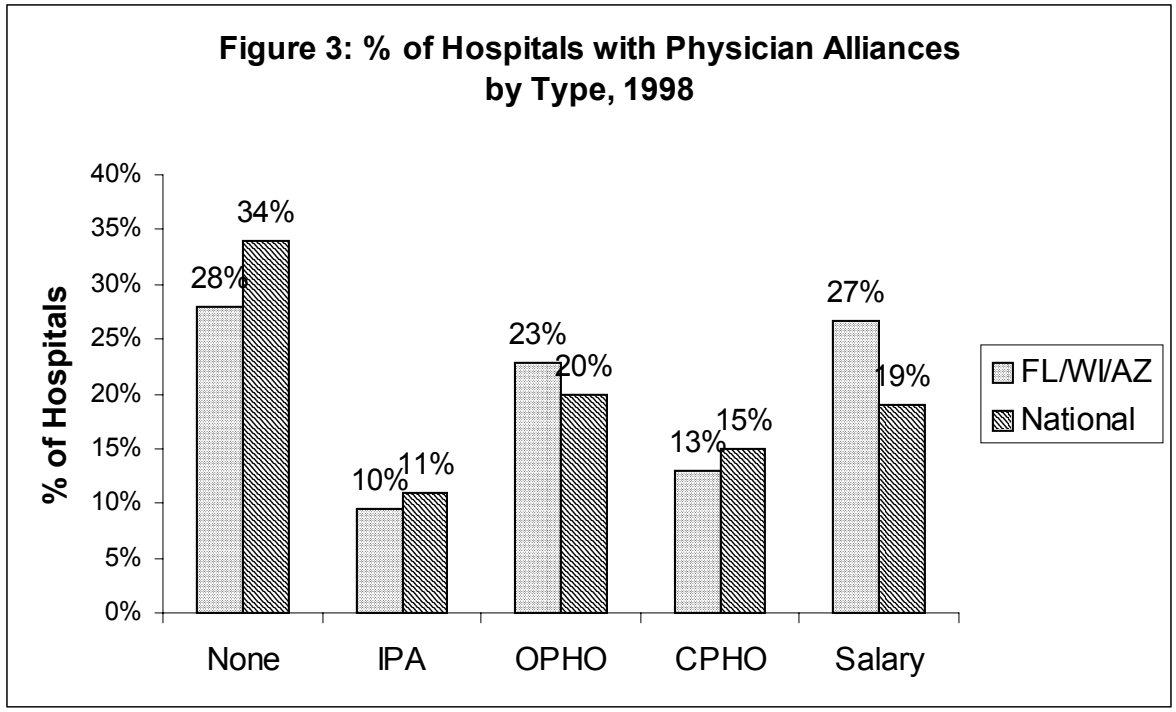


Figure 3: % of Hospitals with Physician Alliances by Type, 1998
% of Hospitals
40%
35%
30%
25%
20%
15%
10%
5%
0%
28%
34%
10%
11%
23%
20%
13%
15%
27%
19%
None
IPA
OPHO
CPHO
Salary
FL/WI/AZ
National

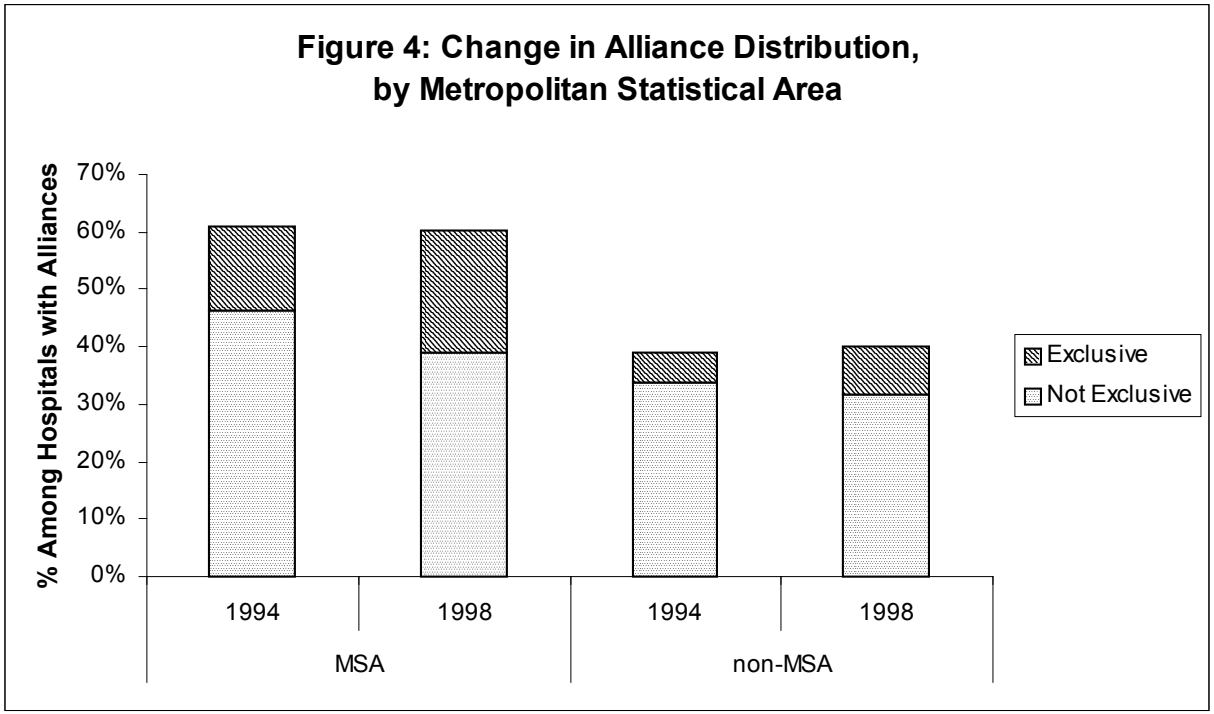


Figure 4: Change in Alliance Distribution,
by Metropolitan Statistical Area
% Among Hospitals with Alliances
70%
60%
50%
40%
30%
20%
10%
0%
1994
1998
1994
1998
MSA
non-MSA
Exclusive
Not Exclusive

Table 1: Characteristics of Physician-Hospital Strategic Alliances

	IPA	OPHO	CPHO	MSO	Integrated
Joint Contracting w/ Managed Care Plans	X	X	X	X	X
Administrative Services		X	X	X	X
Coordinate Care			X	X	X
Physicians Exclusive to Hospital			X	X	X
Fully Integrated Ownership				X (Many)	X
Physicians Salaried					X
Provide Insurance					X (Many)

Table 2: Predicted Effects of Integration

Organizational Type	Performance Indicator	Coasian Contracting Transaction Costs	Efficiency	Bargaining / Market Power*	
				More Competitive Hospital Market	Less Competitive Hospital Market
IPA	Managed Care Price	+			
	Managed Care Volume	+			
	Indemnity Price				
	Indemnity Volume				
	Costs				
OPHO	Managed Care Price	+	–	+	++
	Managed Care Volume	+	+	+	++
	Indemnity Price		–	+	++
	Indemnity Volume		+	?	?
	Costs		–		
CPHO	Managed Care Price	+	–	+	++
	Managed Care Volume	+	+	+	++
	Indemnity Price		–	+	++
	Indemnity Volume		+	?	?
	Costs		–		
SALARY	Managed Care Price	+	–	+	++
	Managed Care Volume	+	+	+	++
	Indemnity Price		–	+	++
	Indemnity Volume		+	?	?
	Costs		–		

* MP Effects of CPHO and SALARY are expected to be larger than OPHO because of physician exclusivity.

Table 3: Descriptive Statistics

	N	Grand Mean	Std Dev Overall	Std Dev	Mean 1994	Std Dev	Mean 1998	Std Dev
IPA	1257	0.11		0.07	0.07		0.10	
OPHO	1257	0.19		0.18	0.17		0.18	
CPHO	1257	0.13		0.09	0.10		0.10	
SALARY	1257	0.16		0.25	0.08		0.18	
Standardized Managed Care Price	988	1,389	390	217	1,280	346	1,444	424
Non-Standardized Managed Care Price	988	1,280	415	230	1,192	369	1,305	468
Standardized Indemnity per diem	1148	2,244	279	344	2,036	731	2,370	735
Non-Standardized Indemnity per diem	1148	1,929	708	276	1,757	578	2,054	820
Managed Care Patients	1257	1,665	2,686	563	1,296	2,132	2,005	3,211
Indemnity Patients	1201	1,088	1,259	399	1,199	1,281	948	1,154
Average Cost per Patient Day	1167	1,874	678	307	1,581	565	2,165	808
Average Cost per Patient	1167	7,818	2,575	1,057	7,244	2,021	8,553	3,131
County Managed Care Penetration	1257	0.21	0.13	0.04	0.17	0.10	0.26	0.14
Market Hospital Wage Index	1257	1,332	116	64	1,236	94	1,416	87
For-profit (=1)	1228	0.23			0.24		0.22	
MSA (=1)	1228	0.59			0.60		0.60	
Teaching (=1)	1228	0.20			0.17		0.20	
with <100 beds (=1)	1228	0.37			0.34		0.36	
With 100-299 beds	1228	0.45			0.47		0.47	
Hospital Inpatient Mortality Rate	1149	0.001	0.004	0.003	0.001	0.004	0.001	0.004
Hospital Discretionary Procedure Rate	1214	0.076	0.053	0.020	0.071	0.044	0.073	0.055
Hospital Surgical Complication Rate	1169	0.032	0.027	0.015	0.031	0.026	0.030	0.022
Hospital Amb Care Sensitive Cond Rate	1210	0.268	0.113	0.063	0.266	0.105	0.259	0.103

Table 4: Model of Organizational Choice, Multinomial Logit

	IPA	OPHO	CPHO	SALARY
MSA (=1)	-0.52**	0.22	-0.00	0.42
	(0.25)	(0.21)	(0.24)	(0.22)
Wage Index	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)
Managed Care Penetration	4.32***	2.19***	3.34***	-0.78
	(1.04)	(0.83)	(1.01)	(0.88)
Teach (=1)	-0.66*	-0.59**	0.34	0.57***
	(0.35)	(0.25)	(0.26)	(0.23)
Beds <100 (=1)	-0.40	-1.25***	-1.34***	-0.45
	(0.34)	(0.28)	(0.31)	(0.13)
Beds 100-299 (=1)	-0.51	-0.40*	-0.82***	0.19
	(0.32)	(0.23)	(0.25)	(0.25)
For-profit (=1)	0.44*	0.19	0.66***	-0.84***
	(0.24)	(0.20)	(0.23)	(0.27)
Constant	0.10	-1.35	-2.03*	-0.04
	(1.40)	(1.10)	(1.32)	(1.16)

N=1257, LR (chi^2) =231***, standard errors in parentheses
* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 5: Changes in Strategic Integration Over Sample Period

Change From	Change to				
	None	IPA	OPEN PHO	Closed PHO	Salary
None	257 (.30)	15 (.02)	26 (.03)	19 (.02)	50 (.06)
IPA	15 (.02)	60 (.07)	3 (.00)	2 (.00)	9 (.01)
Open PHO	18 (.03)	4 (.00)	125 (.14)	9 (.01)	7 (.01)
Closed PHO	8 (.01)	3 (.00)	10 (.01)	75 (.09)	6 (.01)
Salary	37 (.04)	9 (.01)	3 (.00)	2 (.00)	99 (.11)

Total Number of Off Diagonal Changes =255

Table 6: Markov Transition Model of Organizational Adoption

	Adopt IPA	Adopt OPHO	Adopt CPHO	Adopt SALARY
Lagged Change in County Managed Care %	15.77*	-5.75	17.35***	12.59
	(9.05)	(14.82)	(6.64)	(8.00)
Lagged County Managed Care %	7.29*	-1.65	0.73	-1.16
	(4.74)	(2.89)	(4.01)	(3.52)
Lagged Managed Care Share of Hospital's Patients	-6.01	5.60***	0.37	-0.64
	(4.82)	(2.03)	(3.06)	(2.35)
Lagged Average Cost Per Patient Day	-306	-3243	-18.87	-412.82*
	(211)	(88.21)	(61.53)	(216.32)
Lagged Change in Average Cost Per Patient Day	355	121.41	-106.25	536.08
	(242)	(189.67)	96.64))	(326.85)
County Hospital Wage Index	-0.01*	0.00	-0.01	0.00
	(0.01)	(0.01)	(0.00)	(0.00)
MSA (=1)	0.68	0.97	0.89	-0.01
	(0.87)	(1.05)	(1.09)	(0.89)
Teaching (=1)	0.00	0.48	-0.22	1.82**
	0.00	(0.98)	(0.80)	(0.82)
Bedsize <100 (=1)	-0.81	1.69	-1.42*	-0.49
	(0.99)	(1.57)	(0.83)	(0.98)
Bedsize100-299 (=1)	-2.06**	1.58	-0.86	0.78
	(0.99)	(1.02)	(0.59)	(0.81)
For Profit (+1)	0.25	-1.19	0.10	-42.39***
	(0.83)	(0.96)	(0.75)	(0.56)
IPA in Pervious Year (=1)	0.00	0.79	0.03	1.40**
	0.00	(1.21)	(0.82)	(0.66)
OPHO Pervious Year (=1)	0.28	0.00	-0.17	-0.99
	(0.98)	0.00	(0.69)	(1.12)
CPHO Pervious Year (=1)	0.61	1.96*	0.00	0.42
	(1.04)	(0.89)	0.00	(0.70)
SALARY Pervious Year (=1)	1.30*	0.24	-0.90	0.00
	(0.72)	(1.15)	(0.83)	0.00
Constant	13.29	-1.15	3.28	-4.01
	(1.56)	(7.24)	(4.25)	(5.47)
Observations	376			

Standard errors in parentheses;

* Significant at 10% level;** significant at 5% level; *** significant at 1% level.
For salary models F-test of managed care variables: 3.08 and jointly not significant

Table 7: Hospital Cost Functions

	Ln (Cost Per Day)			Ln (Cost per Discharge)		
	(1)	(2)	(3)	(1)	(2)	(3)
IPA (=1)	0.015 (0.020)	0.015 (0.016)	0.016 (0.016)	0.007 (0.019)	0.014 (0.016)	0.015 (0.016)
OPHO (=1)	0.01 (0.018)	0.017 (0.014)	0.017 (0.014)	0.007 (0.016)	-0.017 (0.014)	0.01 (0.014)
CPHO (=1)	-0.019 (0.018)	0.002 (0.014)	0.000 (0.014)	-0.037*8 (0.016)	0.000 (0.014)	0.01 (0.014)
SALARY (=1)	-0.019 (0.017)	-0.008 (0.013)	-0.006 (0.013)	-0.013 (0.015)	0.002 (0.013)	-0.01 (0.013)
ln (Indemnity Patients or Days)[+]		-0.117** (0.054)	-0.129** (0.057)		-0.097* (0.051)	-0.108** (0.051)
ln (Managed Care Patients or Days)[+]		0.013 (0.008)	0.017* (0.009)		0.035*** (0.010)	0.034*** (0.010)
ln (Other Patients or Days)[+]		-1.182*** (0.173)	-1.18*** (0.17)		-0.896*** (0.186)	-0.956*** (0.188)
ln (Indemnity Patients or Days)^2[+]		-0.004 0.004	-0.004 0.004		0.003 0.004	0.003 (0.004)
ln (Managed Care Patients or Days)^2[+]		-0.003** (0.001)	-0.003** (0.001)		-0.007*** (0.001)	-0.007*** (0.02)
ln (Other Patients or Days)^2[+]		0.038*** (0.009)	0.038*** (0.009)		0.033*** (0.012)	0.038*** (0.012)
ln (Average Length of Stay)		-0.007 0.010)	-0.010 (0.056)		0.048*** (0.011)	0.044*** (0.012)
Managed Care Patient Case Mix Index			-0.017* (0.010)			-0.006* (0.041)
Indemnity Patient Case Mix Index			0.033 (0.067)			0.071* (0.041)
Other Patient Case Mix Index			-0.013 (0.012)			0.013 (0.012)
Market Hospital Wage Index	0.000** (0.000)	0.000** (0.000)	0.00 (0.00)	0.000** (0.000)	0.000** (0.000)	0.00*** (0.00)
Constant	7.08*** (0.18)	15.45*** (0.81)	15.44*** (0.880)	8.46** (0.17)	13.75*** (0.18)	13.92*** (0.751)
Joint Test of Year*State Fixed Effects		.00***	.00***		.00***	.00***
Hausman Test, reject RE		.00***	.00***		.00***	.00***
Joint Test of Hospital Fixed Effects		.00***	.00***		.00***	.00***
Observations	1093	1093	1093	1093	1093	1093

Standard errors in parentheses

[+] This variables is measured as patient days in the cost per day models and as patients in the cost per patient models.

significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 8: Managed Care Prices and Patients

	Managed Care Price (Per Day)			ln (Managed Care Patients)		
	(1)	(2)	(3)	(1)	(2)	(3)
IPA	11 (53)	1 (80)		0.02 (0.07)	0.01 (0.10)	
OPHO	93** (41)	85 (78)	89** (39)	0.14** (0.06)	0.16 (0.11)	0.17*** (0.06)
CPHO	82** (43)	372*** (106)	368*** (101)	0.19*** (0.06)	0.13 (0.16)	0.22*** (0.06)
SALARY	-25 (43)	-31 (71)		0.06 (0.06)	0.09 (0.09)	
Market Hospital Wage Index	-0.01 (0.31)	0.10 (0.31)	0.08 (0.30)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
County Managed Care %	-424 (386)	-481 (387)	-474 (382)	4.20*** (0.54)	4.23*** (0.54)	4.19*** (0.51)
IPA*Profit		-98 (117)			0.17 (0.13)	
OPHO*Profit		3 (96)			-0.20 (0.14)	-0.21 (0.13)
CPHO*Profit		-205** (86)	-193** (77)		-0.18 (0.12)	-0.20* (0.12)
IPA*MSA		78 (106)			0.08 (0.15)	
OPHO*MSA		1 (93)			0.02 (0.13)	
CPHO*MSA		-255** (112)	-264** (105)		-0.10 (0.16)	
SALARY*MSA		9 (85)			-0.04 (0.11)	
Constant	1401*** (388)	1256*** (389)	1278*** (386)	4.76*** (0.55)	4.71*** (0.55)	4.67* (0.55
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Hospital Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Observations	880	880	880	951	951	951

Standard errors in parentheses

* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 9: Indemnity Price and Patients

	Indemnity Price (Per Day)			Ln (Indemnity Patients)		
	(1)	(2)	(3)	(1)	(2)	(3)
IPA	58	3		-0.01	0.12	
	(62)	(85)		(0.06)	(0.08)	
OPHO	161***	34		-0.00	-0.03	
	(53)	(90)		(0.05)	(0.09)	
CPHO	128***	263**	245**	0.07	-0.11	
	(53)	(108)	(103)	(0.05)	(0.11)	
SALARY Only	86*	33		-0.05	0.03	
	(52)	(71)		(0.05)	(0.07)	
Market Hospital Wage Index	0.50	0.38	0.36	0.00	0.00	0.00
	(0.41)	(0.40)	(0.40)	(0.00)	(0.00)	(0.00)
Managed Care %	-58	-56	-15.6	-1.45***	-1.38***	-1.44***
	(463)	(459)	(456)	(0.44)	(0.44)	(0.43)
IPA*Profit		-99			-0.18	
		(134)			(0.13)	
OPHO*Profit		596***	632***		-0.14	
		(121)	(106)		(0.13)	
CPHO*Profit		363***	395***		-0.16	
		(124)	(110)		(0.11)	
IPA*MSA		171			-0.18	
		(123)			(0.12)	
OPHO*MSA		21			0.06	
		(111)			(0.11)	
CPHO*MSA		-240**	-280**		0.25**	0.14***
		(121)	(112)		(0.12)	(0.05)
SALARY*MSA		46			-0.13	
		(95)			(0.09)	
Constant	1294**	1447***	1473	7.28**	7.23***	7.26***
	(511)	(504)	(503)	(0.50)	(0.50)	(0.50)
Observations	1059	1059	1059	1113	1113	1113
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***

Standard errors in parentheses
* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 10: Percent Changes in Prices and Volumes From Integration

		Prices		Volume	
		Non-Profit	**For-Profit**	**Non-Profit**	**For-Profit**
Managed Care					
OPHO	Non-MSA	.06** (.03)	.06** (.03)	.17*** (.06)	- .04 (.12)
	MSA	.06** (.03)	.06** (.03)	.17*** (.06)	-.04 (.12)
CPHO	Non-MSA	.26*** (.07)	.13 (.08)	.22*** (.06)	-.02 (.10)
	MSA	.07** (.04)	-.06 (.05)	.22*** (.06)	-.02 (.10)
Indemnity					
OPHO	Non-MSA	0	.28*** (.05)	0	0
	MSA	0	.28*** (.05)	0	0
CPHO	Non-MSA	.11*** (.05)	.29*** (.06)	0	0
	MSA	-.02 (.03)	.16*** (.05)	.14** (.05)	.14** (.05)

***sign at p<.01 level, ** sign at p<.05 level and * at p<.1

Table 11: Charity Care

	Ln (Charity Days)	Ln (Charity Discharges
	(1)	(1)
IPA	.09 (.13)	.07 (.13)
OPHO	-.08 (.10)	-.03 (.10)
CPHO	-.11 (.12)	-.04 (.10)
SALARY Only	.23 (.11	.15* (.10)
Market Hospital Wage Index	0.00** (0.00)	0.00** (0.00)
Managed Care %	-2.17** (1.00)	-2.21** (.85)
IPA*Profit		
OPHO*Profit		
CPHO*Profit		
IPA*MSA		
OPHO*MSA		
CPHO*MSA		
SALARY*MSA		
Constant	8.95 (-547)	7.19*** (0.97)
Observations	1168	1168
Joint Test of Year*State Fixed Effects	.00***	.00***
Hausman Test, reject RE	.00***	.00***
Joint Test of Fixed Effects	.00***	.00***

Standard errors in parentheses
* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 12: Quality Measures for Managed Care Patients

	Utilization		Surgical Complication		Mortality		ACSC	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
IPA	.0010 (.0040)		-.0031 (.0022)		-.0010 (.0009)		.0196 (.0123)	
OPHO	-.0034 (.0022)	-.0001 (.0037)	-.0017 (.0021)	.0000 (.0023)	.0004 (.0004)	.0002 (.0004)	-.0004 (.0080)	-.0010 (.0077)
CPHO	-.0018 (.0024)	-.0071 (.0051)	-.0053*** (.0019)	.0008 (.0041)	.0001 (.0006)	-.0002 (.0014)	-.0005 (.0076)	-.0076 (.0118)
SALARY Only	.0007 (.0026)	.0010 (.0036)	-.0043*** (.0016)	-.0034** (.0015)	.0004 (.0005)	.0005 (.0005)	-.0064 (.0058)	-.0107** (.0048)
Market Hospital Wage	.0000 (.000)	.0000 (.000)	.0000 (.000)	.0000* (.000)	-.0000 (.000)	.0000 (.0000)	-.0000 (.000)	-.0000 (.000)
Managed Care %		-.0103 (.0249)		.0099 (.0195)	-.0074 (.0043)	-.0073* (.0042)	-.0763 (.0705)	.0669 (0717)
IPA*Profit								
OPHO*Profit		.0003 (.0051)		-.0038 (.0039)		.0015 (.0012)		-.0167 (.0136)
CPHO*Profit		-.0016 (.0038)		-.0015 (.0045)		.0035** (.0016)		-.0048 (.0125)
IPA*MSA								
OPHO*MSA								
CPHO*MSA		-.0044 (.0052)		-.0047 (.0041)		-.0001 (.0014)		.0020 (.0131)
Constant	-.0074* (.039)	-.0063 (.0040)	.1931*** (.0092)	.2050*** (.0210)	.0025** (0011)	.0069** (0082)	.2169*** (.0275)	.2162*** (.0278)
Observations (1000s)	93	93	401	401	131	131	370	370

ACSC= ambulatory care sensitive condition

Standard errors in parentheses
* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 13: Quality Measures for Indemnity Patients

	Utilization		Surgical Complication		Mortality		ACSC	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
IPA	.0012		-.0053		.0010		.0057	
	(.0011)		(.0036)		(.0010)		(.0111)	
OPHO	-.0004	-.0005	-.0056**	-.0043	.0005	.0003	.0026	.0027
	(.0007)	(.0007)	(.0021)	(.0026)	(.0005)	(.0006)	(.0054)	(.0052)
CPHO	.0003*	.0004	-.0048**	-.0070	-.0005	-.0012	.0020	-.0150
	(.0006)	(.0019)	(.0016)	(.0050)	(.0004)	(.0008)	(.0047)	(.0092)
SALARY Only	-.0015**	-.0015**	-.0037**	-.0030*	-.0000	-.0001	-.0063	-.0050
	(.0007)	(.0007)	(.0018)	(.0017)	(.0005)	(.0005)	(.0047)	(.0042)
Market Hospital Wage	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
	(.000)	(.000)	(.000)	(.000)	(.000)	(.0000)	(.000)	(.000)
Managed Care %	-.0135	-.0136*	-.0087	-.0049	.0004	.0007	-.0641	-.0415
	(.0084)	(.0080)	(.0124)	(.0139)	(.0041)	(.0042)	(.0465)	(.0474)
IPA*Profit								
OPHO*Profit		-.0013		-.0049		.0006		-.0186
		(.0016)		(.0066)		(.0017)		(.0131)
CPHO*Profit		-.0043*		.0065		.0002		-.0343**
		(.0023)		(.0040)		(.0014)		(.0147)
IPA*MSA								
OPHO*MSA								
CPHO*MSA		.0003		.0024		-.0006		.0244**
		(.0020)		(.0052)		(.0009)		(.0104)
Constant	-.0148***	-.0179***	.0078	.0785***	-.0007	-.0021*	.3363***	.3282
	(.0049)	(.0067)	(.0129)	(.0011)	(0011)	(.0011)	(.0333)	(.0337)
Observations (1000s)	577	577	242	242	83	83	210	210

ACSC= ambulatory care sensitive condition

Robust standard errors in parentheses

* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 14: Hospital Cost Functions Excluding Hospitals that Already Adopted

	Ln (cost per day)			Ln (cost per discharge)		
		(1)	(2)		(1)	(2)
IPA (=1)	0.013	0.006	0.004	0.004	0.009	0.008
	(0.023)	(0.016)	(0.017)	(0.021)	(0.017)	(0.018)
OPHO (=1)	-0.007	0.020	0.018	0.009	0.018	0.02
	(0.020)	(0.014)	(0.016)	(0.018)	(0.016)	(0.016)
CPHO (=1)	-0.029	0.014	-0.014	-0.040*	-0.015	-0.016
	(0.020)	(0.014)	(0.016)	(0.018)	(0.016)	(0.014)
SALARY (=1)	0.021	-0.008	-0.006	-0.014	-0.004	-0.003
	(0.017)	(0.013)	(0.013)	(0.016)	(0.013)	(0.013)
ln (Indemnity Patients or Days)[+]		-0.120**	-0.132**		-0.121**	-0.132**
		(0.054)	(0.057)		(0.051)	(0.052)
ln (Managed Care Patients or Days)[+]		0.011	0.015*		0.030***	0.030***
		(0.008)	(0.009)		(0.010)	(0.010)
ln (Other Patients or Days)[+]		-1.29***	-1.27***		-0.903***	-0.939***
		(0.173)	(0.17)		(0.202)	(0.205)
ln (Indemnity Patients or Days)^2[+]		-0.004	-0.004		0.004	0.005
		0.004	0.004		0.002	(0.004)
ln (Managed Care Patients or Days)^2[+]		-0.003***	-0.003***		-0.007***	-0.007***
		(0.001)	(0.001)		(0.002)	(0.002)
ln (Other Patients or Days)^2[+]		0.043***	0.043***		0.034***	0.037***
		(0.009)	(0.009)		(0.013)	(0.013)
ln (Average Length of Stay)		-0.005	-0.009		0.045***	0.043***
		0.010)	(0.044)		(0.012)	(0.012)
Managed Care Patient Case Mix Index			-0.010*			-0.002*
			(0.010)			(0.010)
Indemnity Patient Case Mix Index			0.053			-0.020*
			(0.044)			(0.041)
Other Patient Case Mix Index			-0.122*			0.110
			(0.064)			(0.068)
Market Hospital Wage Index		0.000**	0.00		0.000***	0.00***
		(0.000)	(0.00)		(0.000)	(0.00)
Constant	6.85***	15.86***	15.73***	8.33***	13.71***	13.74***
	(1.95)	(0.81)	(0.880)	(0.18)	(0.811)	(0.817)
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***		.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***		.00***	.00***
Joint Test of Hospital Fixed Effects	.00***	.00***	.00***		.00***	.00***
Observations	987	987	987	987	987	987

Standard errors in parentheses * significant at 10% level;** significant at 5% level; *** significant at 1% level

[+] This variable is measured as patient days in the cost per day models and as patients in the cost per patient models.

Table 15: Managed Care Prices and Patients
Excluding Hospitals that Already Adopted

	Managed Care Price (Per Day)			ln (Managed Care Patients)		
	(1)	(2)		(1)	(2)	
IPA	-22 (60)	-25 (92)		0.03 (0.08)	0.09 (0.12)	
OPHO	26 (47)	-38 (87)	28 (44)	0.06 (0.07)	0.07 (0.13)	0.12* (0.07)
CPHO	37 (47)	411*** (135)	417*** (130)	0.08 (0.07)	-0.05 (0.20)	-0.13* (0.07)
SALARY	-43 (44)	-65 (70)		0.01 (0.06)	0.04 (0.09)	
Market Hospital Wage Index	-0.25 (0.35)	-0.28 (0.31)	-.31 (35)	0.00 (0.00)	0.00* (0.00)	0.00* (0.00)
County Managed Care %	-351 (394)	-412 (387)	-396 (390)	3.62*** (0.56)	3.61*** (0.57)	3.59*** (0.55)
IPA*Profit		-106 (132)			-0.00 (0.20)	
OPHO*Profit		-71 (108)			-0.38** (0.16)	-0.36** (0.15)
CPHO*Profit		-213** (90)	-192** (83)		-0.22* (0.13)	-0.24* (0.13)
IPA*MSA		93 (115)			-0.11 (0.15)	
OPHO*MSA		97 (102)			0.09 (0.15)	
CPHO*MSA		-334** (136)	-351*** (131)		0.20 (0.20)	
SALARY*MSA		39 (84)			-0.03 (0.11)	
Constant	1634*** (388)	1684*** (439)	1713*** (437)	4.47*** (0.63)	4.31*** (0.63)	4.36*** (0.62)
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Hospital Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Observations	785	785	785	851	851	851

Standard errors in parentheses * significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 16: Indemnity Price and Patients Excluding Hospitals that Already Adopted

	Indemnity Price (Per Day)			ln (Indemnity Patients)		
	(1)	(2)		(1)	(2)	
IPA	35	-9		0.08	0.25***	
	(72)	(96)		(0.07)	(0.09)	
OPHO	152**	-9		-0.01	-0.06	
	(61)	(104)		(0.06)	(0.11)	
CPHO	124**	195	188	0.09	-0.04	
	(62)	(130)	(126)	(0.06)	(0.13)	
SALARY Only	67	-6		-0.03	0.05	
	(55)	(75)		(0.05)	(0.07)	
Market Hospital Wage Index	0.72	0.47	0.46	0.00	0.00	0.00
	(0.47)	(0.47)	(0.47)	(0.00)	(0.00)	(0.00)
Managed Care %	-103	-130	-90	-1.55***	-1.57***	-1.57***
	(497)	(489)	(485)	(0.48)	(0.48)	(0.48)
IPA*Profit		-67			-0.34**	
		(155)			(0.16)	
OPHO*Profit		662***	670***		-0.15	
		(140)	(120)		(0.15)	
CPHO*Profit		431***	450***		-0.17	
		(121)	(119)		(0.12)	
IPA*MSA		106			-0.23	
		(139)			(0.14)	
OPHO*MSA		28			0.12	
		(124)			(0.13)	
CPHO*MSA		-187			0.20	0.12
		(138)			(0.14)	(0.06)
SALARY*MSA		80			-0.15	
		(99)			(0.10)	
Constant	1063*	1363**	1367**	6.79***	6.23***	6.71***
	(581)	(584)	(580)	(0.58)	(0.58)	(0.58)
Observations	955	955	955	1004	1004	1004
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***

Standard errors in parentheses
* significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 17: Hospital Cost Functions Excluding Hospitals that Drop Alliances

	Ln (cost per day)			Ln (cost per discharge)		
		(1)	(2)		(1)	(2)
IPA (=1)	0.043 (0.032)	0.026 (0.025)	0.025 (0.025)	0.024 (0.029)	0.025 (0.025)	0.024 (0.025)
OPHO (=1)	0.019 (0.031)	0.008 (0.024)	0.001 (0.024)	0.007 (0.028)	0.005 (0.024)	0.006 (0.024)
CPHO (=1)	-0.001 (0.028)	0.117 (0.021)	0.015 (0.022)	-0.017 (0.025)	0.014 (0.021)	0.013 (0.022)
SALARY (=1)	-0.013 (0.022)	0.003 (0.018)	0.003 (0.018)	-0.011 (0.020)	0.006 (0.017)	0.006 (0.017)
Ln (Indemnity Patients or Days)[+]		-0.179** (0.076)	-0.194** (0.080)		-0.128* (0.075)	-0.135* (0.077)
ln (Managed Care Patients or Days)[+]		0.031*** (0.011)	0.028** (0.012)		0.049*** (0.013)	0.047*** (0.013)
ln (Other Patients or Days)[+]		-1.282*** (0.272)	-1.28*** (0.273)		-0.914*** (0.286)	-0.925*** (0.289)
ln (Indemnity Patients or Days)^2[+]		0.007 0.005	-0.008 0.005		0.005 0.006	0.005 (0.006)
ln (Managed Care Patients or Days)^2[+]		-0.006*** (0.001)	-0.006*** (0.002)		-0.010*** (0.002)	-0.010*** (0.002)
ln (Other Patients or Days)^2[+]		0.042*** (0.014)	0.042*** (0.014)		0.033* (0.018)	0.034* (0.018)
ln (Average Length of Stay)		-0.014 0.016)	-0.019 (0.016)		0.048*** (0.016)	0.046*** (0.012)
Managed Care Patient Case Mix Index			-0.008* (0.012)			0.009 (0.011)
Indemnity Patient Case Mix Index			0.060 (0.064)			0.038 (0.069)
Other Patient Case Mix Index			-0.016 (0.092)			-0.008 (0.096)
Market Hospital Wage Index		0.000** (0.000)	0.00 (0.00)		0.000*** (0.000)	0.00*** (0.00)
Constant	6.72*** (0.29)	16.06*** (1.29)	16.02*** (1.29)	8.21*** (0.25)	13.80*** (1.150)	13.82*** (1.15)
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Hospital Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Observations	653	653	653	653	653	653

Standard errors in parentheses * significant at 10% level;** significant at 5% level; *** significant at 1% level

[+] This variable is measured as patient days in the cost per day models and as patients in the cost per patient models.

Table 18: Managed Care Prices and Patients
Excluding Hospitals that Drop Alliances

	Managed Care Price (Per Day)			ln (Managed Care Patients)		
	(1)	(2)	(3)	(1)	(2)	(3)
IPA	-44	-163		-0.14	-0.28	
	(86)	(152)		(0.13)	(0.22)	
OPHO	-8	-140		0.14	0.41	0.26**
	(76)	(222)		(0.11)	(0.33)	(0.12)
CPHO	70	557***	-30	0.12	-0.04	0.21**
	(64)	(215)	(73)	(0.09)	(0.32)	(0.09)
SALARY	-28	-3		0.01	0.10	
	(62)	(91)		(0.07)	(0.12)	
Market Hospital Wage Index	-.26	-0.31	-0.32	0.00*	0.00**	0.00*
	(0.46)	(0.31)	(0.46)	(0.00)	(0.00)	(0.00)
County Managed Care %	-770	-785	-769	4.42***	4.40***	4.52***
	(554)	(556)	(542)	(0.54)	(0.77)	(0.76)
IPA*Profit		111			0.14	
		(221)			(0.33)	
OPHO*Profit		-154	-232***		-0.50*	-0.55**
		(176)	(154)		(0.26)	(0.25)
CPHO*Profit		-270**			-0.30	-0.37**
		(136)			(0.20)	(0.19)
IPA*MSA		227			0.21	
		(177)			(0.26)	
OPHO*MSA		162			-0.16	
		(235)			(0.35)	
CPHO*MSA		-450**	-487**		0.24	
		(214)	(106)		(0.32)	
SALARY*MSA		-22			-0.10	
		(110)			(0.15)	
Constant	1902***	1979***	1961***	3.91***	3.57***	3.71***
	(613)	(616)	(607)	(0.86)	(0.87)	(0.86
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Hospital Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Observations	531	531	531	574	574	574

Standard errors in parentheses * significant at 10% level;** significant at 5% level; *** significant at 1% level

Table 19: Indemnity Price and Patients Excluding Hospitals that Drop Alliances

	Indemnity Price (Per Day)			ln (Indemnity Patients)		
	(1)	(2)	(3)	(1)	(2)	(3)
IPA	72	-72		-0.06	0.10	
	(114)	(165)		(0.09)	(0.14)	
OPHO	334***	11		-0.03	-0.35**	
	(104)	(198)		(0.09)	(0.17)	
CPHO	194**	265	274	0.02	-0.23	
	(53)	(240)	(228)	(0.08)	(0.18)	
SALARY Only	107	8		-0.10	0.01	
	(79)	(71)		(0.06)	(0.09)	
Market Hospital Wage Index	1.56	1.12*	1.11*	0.00	0.00	0.00
	(0.69)	(0.68)	(0.67)	(0.00)	(0.00)	(0.00)
Managed Care %	-347	-346	-329	-1.57**	-1.46**	-1.65*
	(760)	(740)	(723)	(0.61)	(0.61)	(0.61)
IPA*Profit		124			-0.32	
		(261)			(0.22)	
OPHO*Profit		1239***	1265***		0.07	
		(229)	(195)		(0.21)	
CPHO*Profit		657***	664***		-0.21	
		(198)	(192)		(0.17)	
IPA*MSA		98			-0.19	
		(112)			(0.19)	
OPHO*MSA		16			0.41**	
		(224)			(0.19)	
CPHO*MSA		-239	-268**		0.39**	0.14*
		(246)	(230)		(0.19)	(0.08)
SALARY*MSA		38			-0.18	
		(149)			(0.12)	
Constant	62	539	561	6.53***	6.46***	6.42***
	(912)	(892)	(875)	(0.82)	(0.82)	(0.82)
Observations	625	625	625	661	661	661
Joint Test of Year*State Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***
Hausman Test, reject RE	.00***	.00***	.00***	.00***	.00***	.00***
Joint Test of Fixed Effects	.00***	.00***	.00***	.00***	.00***	.00***

Standard errors in parentheses
* significant at 10% level;** significant at 5% level; *** significant at 1% level

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